

Moving Industrial Data to the Cloud

By Peter Reynolds

Keywords

AspenTech, AspenTech DataWorks, AspenTech Inmation, Aspen InfoPlus.21, AWS, Cloud, IT-OT Governance

Summary

ARC Advisory Group recently met with Stephane Rioux, Director of Partnerships, AspenTech DataWorks and Rahul Grover, Principal Technology Business Manager, AWS to discuss migrating industrial data from a variety of sources to the AWS Cloud. AspenTech and AWS each shared best practices to help customers make better, faster business decisions using data-driven information on the cloud. ARC Advisory Group learned how industrial organizations are:

- Unlocking and reconciling data from legacy systems and disparate sources to enable operational improvements.
- Aggregating operational data for business intelligence (BI), artificial intelligence (AI) and analytics.
- Realizing a measurable return on digital transformation efforts while achieving top performance.
- Visualizing and sharing industrial data across the enterprise.

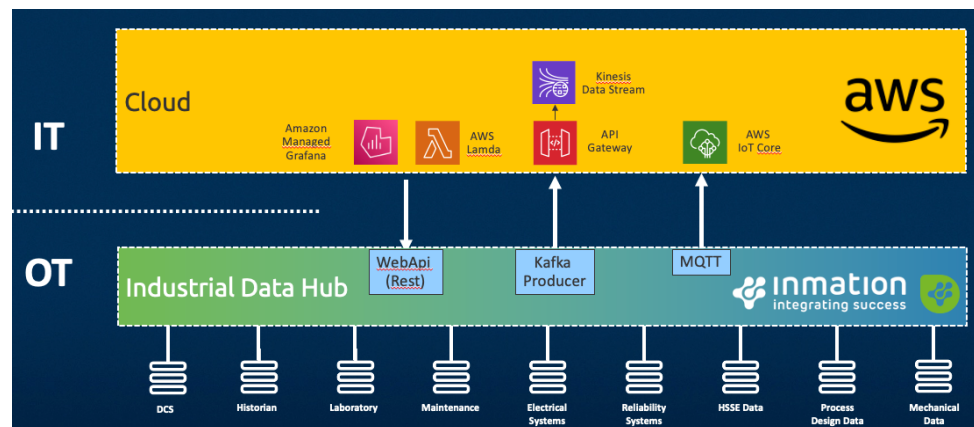
The Challenges in Managing Operations Technology (OT) Data

OT systems for the most part were designed and built to a standard that was created in the 1990s. The Purdue Model or reference architecture became the standard for enterprise architecture for computer integrated manufacturing (CIM) and later the ISA/IEC 62443 family of standards described methods for securing data and connections. While these methods were predictable and secure, from a technology perspective, there is significant point to point connection between data, sensors, and applications. OT organizations over time as the need to scale up requirements for data across the enterprise, many

processes became unmanageable. The result was hundreds of data connections through firewall and a host of maintenance, quality or governance and compliance issues, many of which had the potential to impact production or safety.

The Evolution of OT Architecture

To address these challenges, AspenTech acquired Inmation, an industrial data hub. This centralized data management system allows for the ingestion, processing, augmentation and storage of diverse data, empowering teams from the plant floor to the executive suite. AspenTech Inmation is a tool to make it easier and more secure to connect to plant data at a total cost of ownership that it's feasible. At the core of AspenTech Inmation is a library of connectors to more than 200 OT interfaces.



The Shop Floor to cloud – AWS and AspenTech Inmation

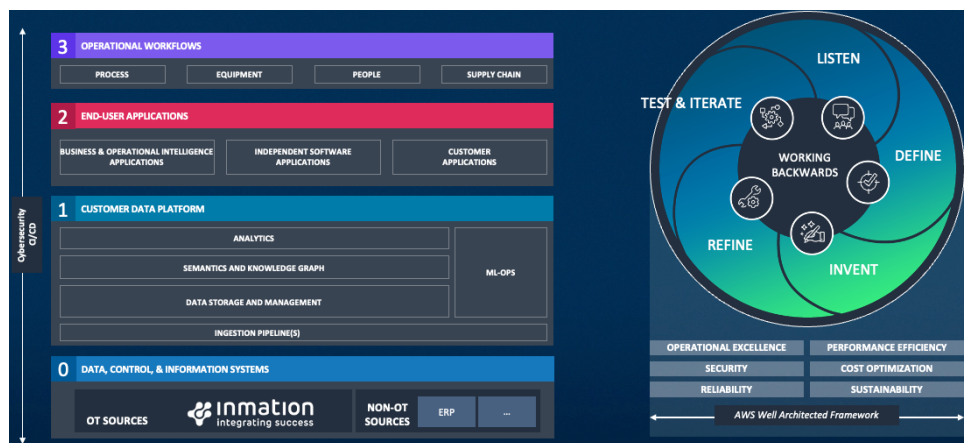
With the AspenTech Inmation data hub, users can eliminate data silos of OT systems like DCS, SCADA, LIMS, Asset Management Systems, and several other systems in a unified namespace and service-oriented-architecture (SOA) and data bus architectures that have existed for more than a decade. SOA is used by IT for enterprise architecture, as a bridge for OT-IT, and to provide centralized management for multiple plants and sites.

The AspenTech DataWorks AWS Partnership

Since AspenTech Inmation is a distributed system, it can be deployed on-premises or in the cloud to cover all security and latency issues. For organizations wanting to extract more value from OT data, AspenTech has partnered with AWS. There are several options to move data to the AWS Cloud. Customers can leverage web API REST for an API endpoint, Amazon-managed Grafana services, or create a lambda pipeline to read the data, or

they can push the data from a Kafka Producer or stream MQTT to Kinesis or AWS IoT Core. Once in the AWS environment, data can be piped to storage or an application in a secure, centrally managed environment.

Value creation in the cloud begins with the AWS Well-Architected Framework. This framework helps cloud architects build secure, high-performing, resilient, and efficient infrastructure for various applications and workloads. Built around six pillars—operational excellence, security, reliability, performance efficiency, cost optimization, and sustainability—AWS Well-Architected provides a consistent approach for customers and partners to evaluate architectures and implement scalable designs.



The Cloud to Shop Floor – AWS and AspenTech Inmation

Data Aggregation and Contextualization in the Cloud

The data aggregation and contextualization process begins with understanding the use case the customer wants to solve, considering the specific end-user personas, and knowing how the solution will make the user's life much easier, improving their productivity. Then, work backward to identify what kind of data is required and what kind of sensor network is currently available, and sketch that architecture together to help users aggregate and contextualize data for developing in-house applications instead of relying solely on commercial applications.

And while industry-specific applications or point solutions and applications architecture have been the staple for industrial manufacturing, creating in-house, purpose-built apps to meet specific business workflows is highly desirable. Alternatively, application architecture describes the behavior of applications used in a business, focused on how they interact with each other

and with users. It is focused on the data consumed and produced by applications rather than their internal structure. In application portfolio management, applications are mapped to business functions and processes as well as costs, functional quality, and technical quality to assess the value provided. While point-solutions are valuable there remains much data “locked” in data silos and limiting data to domain experts. Microsoft Excel often became the form of sharing or manipulating data in context.

Real World Use Cases

Gather Industrial Data for ESG Reporting

Today’s companies are expected to provide an annual report on their environmental, social, and governance (ESG) performance by relevant laws and standards. These standards mandate the establishment of positive relationships with stakeholders such as the communities where companies operate, employees, customers, creditors, investors, suppliers, and local government.

ESG reporting involves disclosing information regarding enterprise operations and risks in three areas: environmental stewardship, social responsibility, and corporate governance. ESG reports are crucial in demonstrating whether a company’s values align with today’s environmental goals.

AspenTech Inmation makes gathering ESG data easier by handling industrial data collection, contextualization, security, and data loss risks. With the data in place, meeting ESG reporting commitments becomes effortless, as the collected ESG data can be utilized to demonstrate compliance.

Improve Operations with Real-time Digital Twins

A digital twin is a virtual representation of a physical product, system, or process. It serves as an almost identical virtual counterpart that can be used for practical purposes, including simulation, integration, testing, monitoring, and maintenance.

One of the main characteristics of the digital twin technology is its connectivity, and this is where AspenTech Inmation comes in. As a real-time data management platform, AspenTech Inmation is capable of aggregating, cleansing, and contextualizing data for use by digital twins.

Technologies such as AspenTech Inmation leverage digital twins and industrial data to enable companies to achieve sustainable smart manufacturing.

Digital twins and virtual models have become essential tools for companies to enhance their performance and drive innovation.

By harnessing real-time data from the plant floor, the digital twin receives critical inputs. Employing predictive measures through AspenTech Inmation, digital twins can help prevent costly machine failures.

Conclusion

Moving industrial data to the cloud and creating the necessary contextualization and aggregation required IT-OT collaboration and breaking down organizational barriers. Clear governance, roles and responsibilities between manufacturing OT experts and corporate IT or enterprise data analytics teams must be established.

The need to eliminate data silos and create apps using data in context cannot be understated. With clear governance covering OT industrial data hubs like the AspenTech Inmation solution and AWS cloud infrastructure, users can leverage the benefits of automatic data aggregation tools with data quality checks, improving the accuracy or reducing the likelihood of errors has become it can be done at the scale at seconds in microseconds. The beauty of the AWS Cloud is unlimited predictable data storage at an inexpensive and predictable cost structure.

Data strategies combining IT and OT data must be based on principles of accessibility in an intelligent management system for sharing with the ability to access unique data access patterns and different categories of data stored in unique formats. The use cases and business requirements for IT-OT data are seemingly endless. Examples include pulling data from market trends and weather data together in context, or having economic data formats and vectors and nodes to allow the query of data in an ecosystem at speed and ultimately enabling it to make on-time decisions. If data management or analytics solutions are not augmenting the experienced user to create the value, then the value of the data is lost. Industrial users need access to data to improve decision-making so that domain experts can further scale up IT-OT data, expand and use that decision-making across the enterprise, and convert that decision-making into quantifying tangible business results.

ARC Advisory Group has written about the AspenTech acquisition of Inmation and the creation of the new AspenTech DataWorks business unit

[here](#). Industrial data and systems have traditionally been in organizational siloes, leaving most of the data not actionable at scale. AspenTech Inmation software provides a single open system to manage a distributed system entirely from a central location with connectivity support for all major OT and IT interfaces. AspenTech's new industrial data solutions consolidate and organize data from various locations into a single open repository in the cloud or corporate data center in a high-available, flexible, real-time database to support the emerging industrial DataOps approaches.

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